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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/017,014	12/14/2001	Markus Loecher	2000P09073US01	7812

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Siemens Corporation
Intellectual Property Department
186 Wood Avenue South
Iselin, NJ 08830

EXAMINER

PALADINI, ALBERT WILLIAM

ART UNIT	PAPER NUMBER
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2125

DATE MAILED: 03/07/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/017,014

Applicant(s)

LOECHER ET AL.

Examiner

Albert W Paladini

Art Unit

2125

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 December 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Specification

The following guidelines illustrate the preferred layout for the specification of a utility application. These guidelines are suggested for the applicant's use.

Arrangement of the Specification

1. As provided in 37 CFR 1.77(b), the specification of a utility application should include the following sections in order. Each of the lettered items should appear in upper case, without underlining or bold type, as a section heading. If no text follows the section heading, the phrase "Not Applicable" should follow the section heading:

- (a) TITLE OF THE INVENTION.
- (b) CROSS-REFERENCE TO RELATED APPLICATIONS.
- (c) STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT.
- (d) INCORPORATION-BY-REFERENCE OF MATERIAL SUBMITTED ON A COMPACT DISC (See 37 CFR 1.52(e)(5) and MPEP 608.05. Computer program listings (37 CFR 1.96(c)), "Sequence Listings" (37 CFR 1.821(c)), and tables having more than 50 pages of text are permitted to be submitted on compact discs.) or
REFERENCE TO A "MICROFICHE APPENDIX" (See MPEP § 608.05(a). "Microfiche Appendices" were accepted by the Office until March 1, 2001.)
- (e) BACKGROUND OF THE INVENTION.
 - (1) Field of the Invention.
 - (2) Description of Related Art including information disclosed under 37 CFR 1.97 and 1.98.
- (f) BRIEF SUMMARY OF THE INVENTION.
- (g) BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S).
- (h) DETAILED DESCRIPTION OF THE INVENTION.
- (i) CLAIM OR CLAIMS (commencing on a separate sheet).
- (j) ABSTRACT OF THE DISCLOSURE (commencing on a separate sheet).
- (k) SEQUENCE LISTING (See MPEP § 2424 and 37 CFR 1.821-1.825. A "Sequence Listing" is required on paper if the application discloses a nucleotide or amino acid sequence as defined in 37 CFR 1.821(a) and if the required "Sequence Listing" is not submitted as an electronic document on compact disc).

Content of Specification

- (a) Title of the Invention: See 37 CFR 1.72(a) and MPEP § 606. The title of the invention should be placed at the top of the first page of the

specification unless the title is provided in an application data sheet. The title of the invention should be brief but technically accurate and descriptive, preferably from two to seven words may not contain more than 500 characters.

- (b) Cross-References to Related Applications: See 37 CFR 1.78 and MPEP § 201.11.
- (c) Statement Regarding Federally Sponsored Research and Development: See MPEP § 310.
- (d) Incorporation-By-Reference Of Material Submitted On a Compact Disc: The specification is required to include an incorporation-by-reference of electronic documents that are to become part of the permanent United States Patent and Trademark Office records in the file of a patent application. See 37 CFR 1.52(e) and MPEP § 608.05. Computer program listings (37 CFR 1.96(c)), "Sequence Listings" (37 CFR 1.821(c)), and tables having more than 50 pages of text were permitted as electronic documents on compact discs beginning on September 8, 2000.

Or alternatively, Reference to a "Microfiche Appendix": See MPEP § 608.05(a). "Microfiche Appendices" were accepted by the Office until March 1, 2001.
- (e) Background of the Invention: See MPEP § 608.01(c). The specification should set forth the Background of the Invention in two parts:
 - (1) Field of the Invention: A statement of the field of art to which the invention pertains. This statement may include a paraphrasing of the applicable U.S. patent classification definitions of the subject matter of the claimed invention. This item may also be titled "Technical Field."
 - (2) Description of the Related Art including information disclosed under 37 CFR 1.97 and 37 CFR 1.98: A description of the related art known to the applicant and including, if applicable, references to specific related art and problems involved in the prior art which are solved by the applicant's invention. This item may also be titled "Background Art."
- (f) Brief Summary of the Invention: See MPEP § 608.01(d). A brief summary or general statement of the invention as set forth in 37 CFR 1.73. The summary is separate and distinct from the abstract and is directed toward the invention rather than the disclosure as a whole. The summary may

point out the advantages of the invention or how it solves problems previously existent in the prior art (and preferably indicated in the Background of the Invention). In chemical cases it should point out in general terms the utility of the invention. If possible, the nature and gist of the invention or the inventive concept should be set forth. Objects of the invention should be treated briefly and only to the extent that they contribute to an understanding of the invention.

- (g) Brief Description of the Several Views of the Drawing(s): See MPEP § 608.01(f). A reference to and brief description of the drawing(s) as set forth in 37 CFR 1.74.
- (h) Detailed Description of the Invention: See MPEP § 608.01(g). A description of the preferred embodiment(s) of the invention as required in 37 CFR 1.71. The description should be as short and specific as is necessary to describe the invention adequately and accurately. Where elements or groups of elements, compounds, and processes, which are conventional and generally widely known in the field of the invention described and their exact nature or type is not necessary for an understanding and use of the invention by a person skilled in the art, they should not be described in detail. However, where particularly complicated subject matter is involved or where the elements, compounds, or processes may not be commonly or widely known in the field, the specification should refer to another patent or readily available publication which adequately describes the subject matter.
- (i) Claim or Claims: See 37 CFR 1.75 and MPEP § 608.01(m). The claim or claims must commence on separate sheet or electronic page (37 CFR 1.52(b)(3)). Where a claim sets forth a plurality of elements or steps, each element or step of the claim should be separated by a line indentation. There may be plural indentations to further segregate subcombinations or related steps. See 37 CFR 1.75 and MPEP § 608.01(i)-(p).
- (j) Abstract of the Disclosure: See MPEP § 608.01(f). A brief narrative of the disclosure as a whole in a single paragraph of 150 words or less commencing on a separate sheet following the claims. In an international application which has entered the national stage (37 CFR 1.491(b)), the applicant need not submit an abstract commencing on a separate sheet if an abstract was published with the international application under PCT Article 21. The abstract that appears on the cover page of the pamphlet published by the International Bureau (IB) of the World Intellectual Property Organization (WIPO) is the abstract that will be used by the USPTO. See MPEP § 1893.03(e).

- (k) Sequence Listing. See 37 CFR 1.821-1.825 and MPEP §§ 2421-2431. The requirement for a sequence listing applies to all sequences disclosed in a given application, whether the sequences are claimed or not. See MPEP § 2421.02.

Claim Rejections - 35 USC § 101

2. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

3. Claims 1-16 are rejected under 35 U.S.C. 101 because the claimed invention is not supported by either a specific, substantial, and credible asserted utility or a well established utility.

The parameters of the relationships on pages 4-6 which are used to predict the “virtual age estimation” are not defined. In order to use these relationships in a methodology, which results in real world estimation values, every parameter of the relationships must be clearly defined. For example, parameters of the wear increment equation on page 5 are not provided. In the field of reliability engineering, not all failures are expressible by “wear increments.” In the case of a tire, a wear increment would be applicable, and might be expressible by the radial amount of the rubber lost in a period of time. Semiconductors are traditionally modeled by the Arrhenius equation, which expresses failure in terms of chemical change. The reliability of electrical components such as resistors are is generally expressed by the exponential reliability function which estimates the life of the component based upon the Mean Time Between Fails, and failure is considered to be catastrophic. It is necessary to understand the type of failure and use the appropriate distribution function such as the Gamma, the

Lognormal, Polynomial Hazard Function, Weibull, Extreme Value distributions etc. The units and dimensions of all equations must be clearly explained. The generalized and undefined relationships provided in the specification do not explain the mechanisms and measurements of the various types of failures. The specification must explain how each type of failure is handled in the equations. For example, the specific distribution function for mechanical failures, for electrical failures, for device failures, etc must be provided. The appropriate units must be utilized so that the combining relationships clearly result in a time to failure.

Lines 13-14 on page 5 state "During the life of the device there will be typically many thousands of vectors, each of which contributes a small increment to total wear." Since not all reliability failures are expressible by wear increments, and wear increments differ in type, it is necessary to explain all variables in the relationships in terms of the actual measurements of physical failure, and how the terms in the equations are used to normalize all of these parameters into a resultant time to failure. In order for this invention to have utility, it would be necessary to demonstrate how a variety of failure mechanisms could be combined into the relationships on pages 4-6. Each variable must be defined and the resultant output expressible in measurable or understandable physical units such as time MTBF, cm of wear, chemical change with respect to time, etc. As expressed, it is not explained how these relationships result in "virtual age" which is a time measurements. The actual wear increments are not expressed for any types of failures. Each variable of each equation must be defined, and it must be demonstrated how the relationships generate time to failure.

Pages 136 through 183 of Reliability Engineering by The ARINC RESEARCH CORPORATION have been provided as a guide to demonstrate the application of statistical and probabilistic mathematics to actual reliability measurement and prediction. The methodology provided by ARINC has substantial utility in that it is amenable to measurement and calculation using real world parameters.

Since Hermite Polynomials are normally used as the solution of Hermite's differential equations arising from Sturm-Liouville Boundary value problems applied to harmonic oscillators in quantum mechanics, it is not understood how these relationships are used here for reliability failure predictions.

Claim Rejections - 35 USC § 112

4. Claims 1-16 are also rejected under 35 U.S.C. 112, first paragraph. Specifically, since the claimed invention is not supported by either a specific, substantial, and credible asserted utility or a well established utility for the reasons set forth above, one skilled in the art clearly would not know how to use the claimed invention.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 1-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Eryurek (6754601).

Although the application lacks utility, a rejection was made using a reference, which demonstrates that it can be implemented in a real world environment and which meets the recited objective using the recited limitations, which are understood.

Eryurek discloses a diagnostic circuit, which has the capability of predicting virtual age estimation by determining the coefficients of a "polynomial" which is a function of "wear increments". Referring to figure 4, Eryurek states on lines 35-49 in column 9 "One embodiment of diagnostic circuitry 14 can use empirical models or polynomial curve-fitting which are functions of the difference D. For example, a polynomial, which is a function of the difference D, can be used for computing the residual lifetime estimate or the life expectancy of resistive element 12. The constants and/or the equations may be sent over a two wire loop to process device circuitry 30. In another embodiment, processing system 18 of diagnostic circuitry 14 is implemented with a multi-layer neural network. Although a number of training algorithms can be used to develop a neural network model for different goals, one embodiment includes the known Backpropagation Network (BPN) to develop neural network modules which will capture the nonlinear relationship among a set of input and outputs(s)." Eryurek teaches the use of a polynomial to model the age as a function of wear increments, but it is not specifically a Hermite polynomial as recited in the claims.

The purpose of the polynomial is to obtain the best fit between wear data and virtual age prediction. Since, as explained in paragraph 3, the instant application does

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not provide a specific reason for the selection of a Hermite polynomial, it would have been obvious to one of ordinary skill in the art that a best fit could be obtained by fitting any polynomial to the data, obtaining the appropriate coefficients using a least squares method, maximum likelihood or equivalent technique, and establishing appropriate confidence limits.

Relevant Prior Art

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Killpatrick (5719675) discloses a lifetime prediction method for a laser gyro based on the measurement of certain gyro performance parameters. The parameters measured are laser intensity, readout intensity, volts per mode, which is a derived quantity, and other gyro parameters. The performance parameters are monitored as a function of time over the lifetime of the laser gyro. The method fits the last 1000 hours of performance data to a predetermined linear, quadratic or higher order polynomial fit. When the laser gyro operates it can be polled to respond with its minimum estimated lifetime. The laser gyro warns the inertial navigation system using the laser gyro upon impending system failure. The method weights data to a particular laser gyro based on predetermined critical operating temperatures. The method of the invention creates a history of lifetime performance characteristics based on these critical temperatures. The laser gyro warns the inertial navigation system as it fails by sending different "levels of warning" depending on how much time is left in the estimated lifetime of the laser gyro.

Hamada (6031246) discloses a simulation method for semiconductor devices which uses a polynomial to determine the reliability of semiconductor devices constituted by transistors such as MOSFETs formed under the same processing conditions despite the fact that the transistors have different shapes, sizes and numbers.

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Letton (6386018) discloses an ultrasonic flow detector and teaches the use of second order polynomials to estimate the parameters of the detector including the failure rate.

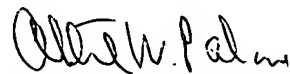
Celniker (6395815) discloses a model for simulating the deformation of surfaces in which the energy functional is a quadratic equation, which is minimized by the solution of linear equations. Celniker teaches the use of Hermite polynomials when working with B-splines.

9. Any inquiry concerning this communication or earlier communication from the examiner should be direct to Albert W. Paladini whose telephone number is (571) 272-3748. The examiner can normally be reached from 7:00 to 3:00 PM on Monday, Tuesday, Thursday, and Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Leo P. Picard, can be reached on (571) 272-3749. The official fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

March 4, 2005



Albert W. Paladini
Primary Examiner
Art Unit 2125.